CLIMATE AND THE SOLAR SYSTEM

By Albert Jacobs
November 2016

The basic Intergovernmental Panel on Climate Change (IPCC) premise of increases in atmospheric carbon dioxide causing run-way global warming is being rejected on the basis of the assumed sensitivity and a misstatement of the atmosphere's energy balance. It has been falsified by the record of empirical observations of the last 20 years. In addition computer simulations do not constitute proof of a scientific theory in any case.

The Sun is the major driver of climate change, both directly and indirectly. Meanwhile, IPCC has studiously avoided to treat the Sun and the solar system with anything more than its incomplete version of the TSI (Total solar irradiance), which shows only very minor variations. However, the influence of the sun and the solar system has been proven to be far more complex.

Research on the ways in which solar activity influences climate change on the planets (including us) has been going on since the mid 1900's and includes:
* variations in the "solar wind", both in the quantity and the quality (type) of solar radiation received on earth,
* the behaviour of the solar dual dynamo over the full 22-year solar Hale cycle of polar magnetic reversal,
* the effects of conjunction and opposition of the major planets orbiting the sun, causing the Sun to corkscrew around the gravity centre of the solar system in a cyclical manner,
* the influence of the variations in solar radiation on the Galactic Cosmic Ray flux, which affects worldwide cloud cover intensity.

A number of major "connections" has been made. Lack of funding for non-CO2 climate solutions has limited the scope of research. A full assessment of the solar system's share of the 'music of the spheres' would introduce into the IPCC's programming the need to accommodate complex dynamically interacting parameters, which its computer programs of linear equations are not equipped to handle.

Climate is a non-linear, dynamic, near chaotic complex, but there are some major natural forces that can be identified and measured. One relatively well-established mechanism is the Galactic Cosmic Ray (GCR) flux, which varies slightly as our solar system passes through the arms of the galaxy (Shaviv & Veizer). This stream of ions, particles and nuclear components is then modulated by the varying ‘solar wind’ to affect global cloud cover and temperature (Svensmark). The nucleation effect of the GCR particles has been confirmed by experiments using the CLOUD experiment at the nuclear facility CERN.

The sun itself is subject to a number of cyclic oscillations <http://pubs.usgs.gov/fs/fs-0095-00/fs-0095-00.pdf> some of which are connected to the GCR process, but most are inherent in the solar system itself. Orbital forces are exerted on the sun by the larger planets. Planetary conjunctions and oppositions have been suggested as calculable influences. The sun wobbles and describes complex circles around the system’s barycentre. It’s called the SIM (Solar inertial Movement) and correlates with major earthly temperature changes of the last 1000 years, including the Little Ice Age. This is not new. It was developed by Jose in 1965 and many others, including Charvatova, have refined it in recent years; a 179 year cycle has been recognised.

Much of the mechanism remains speculative. A recent series of papers is at <http://www.pattern-recogn-phys.net/special_issue2.html>.
The larger planets may also have an influence on the sun’s tachocline, the 30,000 km boundary layer between the inner plasma and the outer convection layer, which itself is 200,000 km thick. It has been suggested that the tachocline, may have a pulsating character. The differential rotational movements of layers in the convection zone (expressed in the polar to equatorial path of the sunspots) disturb the convection cells and feed the dual dynamo of the sun, one a poloidal field, the other toroidal (polar/equatorial). Their interplay is exhibited in the full 22-year Hale Solar Cycle, marked by pole reversals. The major pattern of it has a periodic component that seems to control the Grand Maxima and Grand Minima of solar magnetic expression and thus its various influences on earthly climate. (J. Abreu, Ian Wilson, Don Easterbrook).

The latter influence is primarily transmitted through the behaviour of the oceans. The Atlantic Multidecadal Oscillation (AMO) correlates well with solar cycles and the Pacific Decadal Oscillation (PDO) does so with a delay. Oceanic SST (sea surface temperature) reacts slowly to change and lag times are common.

Here in Western North America, the positive PDO gives us warmer weather. Its 30 year reign is now over and cooler weather will prevail (as in 1940-1970); unfortunately for all of us, we are also at a phase transition point in the solar magnetic fields of the sort that ends the Grand Maximum we have been enjoying. Duhau & deJager are not the only ones to recognise a major transition, possibly to a Solar Grand Minimum that may occupy much of the rest of this century.

In terms of immediate climate consequences, the transition seems also to be connected with the formation of strong Polar Highs, outbreaks of which interfere with the meridional circulation (jet stream) and may set up blocking patterns of Rossby waves from which we have been suffering now for some time, extended hot spells in the summer, cold ones in the winter (Tim Ball).

On a longer time scale, many researchers are studying the nature and mechanisms of the Dansgaard/Oeschger, Heinrich and Bond cycles that are so prominent in the Late Pleistocene and near the boundary of the last glacial period and the beginning of our Holocene interglacial. Atlantic meridional overturning circulation (AMOC) reversals, paleobotany and isotope geology are the proxy tools. A major symposium was held in Buenos Aires in 2013 (a Springer Series publication).

The research suffers from lack of funding, which is largely directed to greenhouse gases as a presumed agent for Anthropogenic Climate Change.

Albert F. Jacobs
Calgary, Canada

Friends of Science Society